Elastic Compute Service

Best Practices

Best Practices

Use OpenAPI to manage ECS

Use OpenAPI to Create Instance

In addition to the ECS Console or Buy Page, you can also use OpenAPI code to elastically create and manage ECS instances. This article describes how to create an ECS instance using Python.

When creating an ECS instance, pay attention to the following APIs:

- Create an ECS instance
- Query an instance list
- Start an ECS instance
- Allocate a public IP address

Create a Pay-As-You-Go ECS instance

Mandatory attributes:

- SecurityGroupId: Security group ID. A security group is used to implement the configurations of a group of instances based on firewall rules to protect the network access requests of the instances. It is recommended that only necessary access rules, rather than all access rules, be enabled when you configure security group access rules. You can create a security group on the ECS Console.
- InstanceType: Instance type. Refer to the ECS Buy Page. The option “one-core 2GB n1.small” indicates that the input parameter is “ecs.n1.small”.
- ImageId: Image ID. Refer to the image list on the ECS console. You can filter public images or custom images.

For more parameter settings, refer to Create an ECS instance.

Create an ECS instance

The following code shows creating an I/O optimized classic-network ECS instance with SSD as system

disk and “cloud_ssd” as disk parameter.

```
# create one after pay ecs instance.
def create_after_pay_instance(image_id, instance_type, security_group_id):
request = CreateInstanceRequest();
request.set_ImageId(image_id)
request.set_SecurityGroupId(security_group_id)
request.set_InstanceType(instance_type)
request.set_IoOptimized('optimized')
request.set_SystemDiskCategory('cloud_ssd')
response = _send_request(request)
instance_id = response.get('InstanceId')
logging.info("instance %s created task submit successfully.", instance_id)
return instance_id;
```

An instance ID is returned after the ECS instance is created successfully. If creation fails, an error code is returned. Since there are many parameters, you can make adjustments by visiting the ECS Buy Page.

```
{"InstanceId":"i-***","RequestId":"006C1303-BAC5-48E5-BCDF-7FD5C2E6395D"}
```

ECS lifecycle

For details about the operations in different ECS status, refer to ECS Instance Lifecycle.

Only when an instance is in the Stopped status, can the Start operation be performed, and only when it is in the Running status, can the Stop operation be performed. To query the ECS status, you can filter the instance list by inputting the parameter Instance ID. When you call DescribeInstancesRequest, input a JSON array of strings to query the resource status. When you query the status of a single instance, we suggest using DescribeInstances rather than DescribeInstanceAttribute, because the former API returns more attributes and content than the latter.

The following code is used to check the instance status. The system returns instance details only when the instance status conforms to the input parameters.

```
# output the instance owned in current region.
def get_instance_detail_by_id(instance_id, status='Stopped'):
logging.info("Check instance %s status is %s", instance_id, status)
request = DescribeInstancesRequest()
request.set_InstanceIds(json.dumps([instance_id]))
response = _send_request(request)
instance_detail = None
if response is not None:
instance_list = response.get('Instances').get('Instance')
for item in instance_list:
if item.get('Status') == status:
instance_detail = item
break;
```

```
return instance_detail;
```

Start an ECS instance

After an ECS instance is created successfully, the default instance status is Stopped. To change to the Running status, send the Start command.

```
def start_instance(instance_id):
request = StartInstanceRequest()
request.set_InstanceId(instance_id)
_send_request(request)
```

Stop an ECS instance

To stop an ECS instance, just use the input instance ID.

```
def stop_instance(instance_id):
request = StopInstanceRequest()
request.set_InstanceId(instance_id)
_send_request(request)
```

Enable “ECS automatic startup” when creating an ECS instance

The ECS Start and Stop operations are asynchronous. You can perform the operation when the script is creating an ECS instance and detecting if it is in an appropriate status.

After you obtain the ID of a successfully created ECS instance, check whether the instance is in the Stopped status. If it is in the Stopped status, send the Start ECS command and wait until the ECS status changes to Running.

```
def check_instance_running(instance_id):
detail = get_instance_detail_by_id(instance_id=instance_id, status=INSTANCE_RUNNING)
index = 0
while detail is None and index < 60:
detail = get_instance_detail_by_id(instance_id=instance_id);
time.sleep(10)

if detail and detail.get('Status') == 'Stopped':
logging.info("instance %s is stopped now.")
start_instance(instance_id=instance_id)
logging.info("start instance %s job submit.")

detail = get_instance_detail_by_id(instance_id=instance_id, status=INSTANCE_RUNNING)
while detail is None and index < 60:
detail = get_instance_detail_by_id(instance_id=instance_id, status=INSTANCE_RUNNING);
time.sleep(10)

logging.info("instance %s is running now.", instance_id)
```

```
return instance_id;
```

Allocate a public IP address

If you specify the public network bandwidth when creating an ECS instance, you need to call an API to allocate a public IP address to the instance for public network access. For details, refer to Allocate a public IP address.

Create an ECS instance in the Subscription mode

OpenAPI also supports creating ECS instances in the Subscription mode, in addition to Pay-As-You-Go ECS instances. The process for creating an ECS instance in the Subscription mode is different from that on Alibaba Cloud’ s website. Fees are automatically deducted for an ECS instance created in the Subscription mode. Before you create an ECS instance, ensure that you have sufficient account balance or credit amount, so that the fees can be deducted directly during creation.

When creating an ECS instance in Subscription mode, you only need to specify the payment option and duration. In the following code, the duration is set to one month.

```
request.set_Period(1)  request.set_InstanceChargeType( ‘PrePaid’ )
```

The complete code for creating an ECS instance in the Subscription mode is as follows:

```
# create one prepay ecs instance.
def create_prepay_instance(image_id, instance_type, security_group_id):
request = CreateInstanceRequest();
request.set_ImageId(image_id)
request.set_SecurityGroupId(security_group_id)
request.set_InstanceType(instance_type)
request.set_IoOptimized('optimized')
request.set_SystemDiskCategory('cloud_ssd')
request.set_Period(1)
request.set_InstanceChargeType('PrePaid')
response = _send_request(request)
instance_id = response.get('InstanceId')
logging.info("instance %s created task submit successfully.", instance_id)
return instance_id;
```

Complete code

See the complete code as follows. You can use your resource parameters for configuration.

```
#  coding=utf-8
# if the python sdk is not install using 'sudo pip install aliyun-python-sdk-ecs'
# if the python sdk is install using 'sudo pip install --upgrade aliyun-python-sdk-ecs'
# make sure the sdk version is 2.1.2, you can use command 'pip show aliyun-python-sdk-ecs' to check
```

```
import json
import logging
import time

from aliyunsdkcore import client
from aliyunsdkecs.request.v20140526.CreateInstanceRequest import CreateInstanceRequest
from aliyunsdkecs.request.v20140526.DescribeInstancesRequest import DescribeInstancesRequest
from aliyunsdkecs.request.v20140526.StartInstanceRequest import StartInstanceRequest

# configuration the log output formatter, if you want to save the output to file,
# append ",filename='ecs_invoke.log'" after datefmt.

logging.basicConfig(level=logging.INFO,
format='%(asctime)s %(filename)s[line:%(lineno)d] %(levelname)s %(message)s',
datefmt='%a, %d %b %Y %H:%M:%S')

clt = client.AcsClient('Your Access Key Id', 'Your Access Key Secrect', 'cn-beijing')

IMAGE_ID = 'ubuntu1404_64_40G_cloudinit_20160727.raw'
INSTANCE_TYPE = 'ecs.s2.large' # 2c4g generation 1
SECURITY_GROUP_ID = 'sg-****'
INSTANCE_RUNNING = 'Running'

def create_instance_action():
instance_id = create_after_pay_instance(image_id=IMAGE_ID, instance_type=INSTANCE_TYPE,
security_group_id=SECURITY_GROUP_ID)
check_instance_running(instance_id=instance_id)

def create_prepay_instance_action():
instance_id = create_prepay_instance(image_id=IMAGE_ID, instance_type=INSTANCE_TYPE,
security_group_id=SECURITY_GROUP_ID)
check_instance_running(instance_id=instance_id)

# create one after pay ecs instance.
def create_after_pay_instance(image_id, instance_type, security_group_id):
request = CreateInstanceRequest();
request.set_ImageId(image_id)
request.set_SecurityGroupId(security_group_id)
request.set_InstanceType(instance_type)
request.set_IoOptimized('optimized')
request.set_SystemDiskCategory('cloud_ssd')
response = _send_request(request)
instance_id = response.get('InstanceId')
logging.info("instance %s created task submit successfully.", instance_id)
return instance_id;

# create one prepay ecs instance.
def create_prepay_instance(image_id, instance_type, security_group_id):
request = CreateInstanceRequest();
request.set_ImageId(image_id)
request.set_SecurityGroupId(security_group_id)
request.set_InstanceType(instance_type)
request.set_IoOptimized('optimized')
request.set_SystemDiskCategory('cloud_ssd')
request.set_Period(1)
```

```
request.set_InstanceChargeType('PrePaid')
response = _send_request(request)
instance_id = response.get('InstanceId')
logging.info("instance %s created task submit successfully.", instance_id)
return instance_id;

def check_instance_running(instance_id):
detail = get_instance_detail_by_id(instance_id=instance_id, status=INSTANCE_RUNNING)
index = 0
while detail is None and index < 60:
detail = get_instance_detail_by_id(instance_id=instance_id);
time.sleep(10)

if detail and detail.get('Status') == 'Stopped':
logging.info("instance %s is stopped now.")
start_instance(instance_id=instance_id)
logging.info("start instance %s job submit.")

detail = get_instance_detail_by_id(instance_id=instance_id, status=INSTANCE_RUNNING)
while detail is None and index < 60:
detail = get_instance_detail_by_id(instance_id=instance_id, status=INSTANCE_RUNNING);
time.sleep(10)

logging.info("instance %s is running now.", instance_id)
return instance_id;

def start_instance(instance_id):
request = StartInstanceRequest()
request.set_InstanceId(instance_id)
_send_request(request)

# output the instance owned in current region.
def get_instance_detail_by_id(instance_id, status='Stopped'):
logging.info("Check instance %s status is %s", instance_id, status)
request = DescribeInstancesRequest()
request.set_InstanceIds(json.dumps([instance_id]))
response = _send_request(request)
instance_detail = None
if response is not None:
instance_list = response.get('Instances').get('Instance')
for item in instance_list:
if item.get('Status') == status:
instance_detail = item
break;
return instance_detail;

# send open api request
def _send_request(request):
request.set_accept_format('json')
try:
response_str = clt.do_action(request)
logging.info(response_str)
response_detail = json.loads(response_str)
return response_detail
except Exception as e:
logging.error(e)
```

```
if __name__ == '__main__':
logging.info("Create ECS by OpenApi!")
create_instance_action()
# create_prepay_instance_action()
```

In addition to using Alibaba Cloud’ s ECS Console for resource creation and daily management, you can also use OpenAPI to manage and customize resources. OpenAPI allows you to manage and configure ECS instances with greater flexibility.

Alibaba Cloud encapsulates OpenAPI in an SDK to integrate ECS instance management into existing systems. This article describes how to manage ECS instances through OpenAPI based on Python development. You can develop ECS instances easily even if you do not have Python development experience.

Get the access key for a RAM sub-account

An access key (Access Key ID and Access Key Secret) is required when you want to use OpenAPI to manage ECS instances. To keep your cloud service secure, you have to create a RAM sub-account and generate an access key for it, and authorize the sub-account to manage ECS resources only. Then, you can use the RAM sub-account and its access key to manage ECS resources by using OpenAPI.

Follow the steps to get the access key for a RAM sub-account.

1. Create a RAM sub-account and get the access key.
2. Grant permissions to the RAM sub-account directly. To manage ECS resources, you have to grant **AliyunECSFullAccess** to the sub-account.

Install the ECS Python SDK

Ensure that the Python runtime environment has been installed. This article uses Python 2.7+.

```
pip install aliyun-python-SDK-ecs
```

If you do not have the permission, switch to sudo to continue.

```
sudo pip install aliyun-python-SDK-ecs
```

The SDK version is **2.1.2**.

Hello Alibaba Cloud

Create the file **hello_ecs_api.py**. To use SDK, you have to use the access key of the RAM sub-account

to instantialize an AcsClient object.

> The access key allows the RAM sub-account to access Alibaba Cloud APIs and give you full access to the sub-account. Keep them safe.

```
from aliyunSDKcore import client
from aliyunSDKecs.request.v20140526.DescribeInstancesRequest import DescribeInstancesRequest
from aliyunSDKecs.request.v20140526.DescribeRegionsRequest import DescribeRegionsRequest
clt = client.AcsClient('Your Access Key Id', 'Your Access Key Secret', 'cn-beijing')
```

You can develop your first application after the AcsClient object is instantiated. Query the list of regions that your account supports. For details, refer to Query the list of available regions.

```
def hello_aliyun_regions():
request = DescribeRegionsRequest()
response = _send_request(request)
region_list = response.get('Regions').get('Region')
assert response is not None
assert region_list is not None
result = map(_print_region_id, region_list)
logging.info("region list: %s", result)

def _print_region_id(item):
region_id = item.get("RegionId")
return region_id

def _send_request(request):
request.set_accept_format('json')
try:
response_str = clt.do_action(request)
logging.info(response_str)
response_detail = json.loads(response_str)
return response_detail
except Exception as e:
logging.error(e)

hello_aliyun_regions()
```

In the command line, run python hello_ecs_api.py to obtain a list of supported regions. The output is similar to the following.

```
[u'cn-shenzhen', u'ap-southeast-1', u'cn-qingdao', u'cn-beijing', u'cn-shanghai', u'us-east-1', u'cn-hongkong', u'me-east-1', u'ap-southeast-2', u'cn-hangzhou', u'eu-central-1', u'ap-northeast-1', u'us-west-1']
```

Query the list of ECS instances in the current region

The process for querying the instance list is similar to the region list. You only need to replace the

input parameter DescribeRegionsRequest with DescribeInstancesRequest. For a full list of query parameters, refer to Query an instance list.

```
def list_instances():
request = DescribeInstancesRequest()
response = _send_request(request)
if response is not None:
instance_list = response.get('Instances').get('Instance')
result = map(_print_instance_id, instance_list)
logging.info("current region include instance %s", result)

def _print_instance_id(item):
instance_id = item.get('InstanceId');
return instance_id
```

The output is as follows.

```
current region include instance [u'i-****', u'i-****'']
```

For a full list of APIs, refer to ECS API overview. If you want to query a list of disks, replace DescribeInstancesRequest with DescribeDisksRequest.

Complete code

The following is the complete code of the operations described in this document.

```
#  coding=utf-8
# if the python SDK is not install using 'sudo pip install aliyun-python-SDK-ecs'
# if the python SDK is install using 'sudo pip install --upgrade aliyun-python-SDK-ecs'
# make sure the SDK version is 2.1.2, you can use command 'pip show aliyun-python-SDK-ecs' to check

import json
import logging

from aliyunSDKcore import client
from aliyunSDKecs.request.v20140526.DescribeInstancesRequest import DescribeInstancesRequest
from aliyunSDKecs.request.v20140526.DescribeRegionsRequest import DescribeRegionsRequest

# configuration the log output formatter, if you want to save the output to file,
# append ",filename='ecs_invoke.log'" after datefmt.
logging.basicConfig(level=logging.INFO,
format='%(asctime)s %(filename)s[line:%(lineno)d] %(levelname)s %(message)s',
datefmt='%a, %d %b %Y %H:%M:%S')

clt = client.AcsClient('Your Access Key Id', 'Your Access Key Secret', 'cn-beijing')

# sample api to list aliyun open api.
def hello_aliyun_regions():
request = DescribeRegionsRequest()
response = _send_request(request)
```

```
if response is not None:
region_list = response.get('Regions').get('Region')
assert response is not None
assert region_list is not None
result = map(_print_region_id, region_list)
logging.info("region list: %s", result)

# output the instance owned in current region.
def list_instances():
request = DescribeInstancesRequest()
response = _send_request(request)
if response is not None:
instance_list = response.get('Instances').get('Instance')
result = map(_print_instance_id, instance_list)
logging.info("current region include instance %s", result)

def _print_instance_id(item):
instance_id = item.get('InstanceId');
return instance_id

def _print_region_id(item):
region_id = item.get("RegionId")
return region_id

# send open api request
def _send_request(request):
request.set_accept_format('json')
try:
response_str = clt.do_action(request)
logging.info(response_str)
response_detail = json.loads(response_str)
return response_detail
except Exception as e:
logging.error(e)

if __name__ == '__main__':
logging.info("Hello Aliyun OpenAPI!")
hello_aliyun_regions()
list_instances()
```

If you want to learn other API operations in ECS, refer to ECS API operation.

Use OpenAPI to Release Instance

One important feature of ECS is on-demand resource creation. You can create custom resources elastically on demand during peak service hours, and then release those resources after service computing is completed. This article offers you several tips about how to easily release ECS instances and achieve elasticity.

This article involves the following important functions and related APIs:

- Release Pay-As-You-Go ECS instances
- Set the automatic release time for Pay-As-You-Go ECS instances
- Stop an ECS instance
- Instance list query API

After an ECS instance is released, the physical resources used by the instance are recycled, including disks and snapshots. The related data is completely lost and can never be recovered. If you want to retain the data, you are advised to create snapshots of disk data before releasing the ECS instance. The snapshots can be directly used to create a new ECS instance.

Release an ECS instance

Before you release an ECS instance, it is required that it is in the Stopped status. If any application is affected after the ECS instance is stopped, restart the instance.

Stop an ECS instance

The command used to stop an ECS instance in Pay-As-You-Go mode and subscription mode is simple and same. The stop command contains the parameter ForceStop. If it is set to “True”, the ECS instance is stopped directly but data is not necessarily written to a disk, similar to power failure. You can set this parameter to “True” if you only want to release the ECS instance.

```
def stop_instance(instance_id, force_stop=False):
'''
stop one ecs instance.
:param instance_id: instance id of the ecs instance, like 'i-***'.
:param force_stop: if force stop is true, it will force stop the server and not ensure the data
write to disk correctly.
:return:
'''
request = StopInstanceRequest()
request.set_InstanceId(instance_id)
request.set_ForceStop(force_stop)
logging.info("Stop %s command submit successfully.", instance_id)
_send_request(request)
```

Release an ECS instance

If you try to release an ECS instance without stopping it, the following error may be returned:

```
{"RequestId":"3C6DEAB4-7207-411F-9A31-6ADE54C268BE","HostId":"ecs-cn-
hangzhou.aliyuncs.com","Code":"IncorrectInstanceStatus","Message":"The current status of the resource does not
support this operation."}
```

When the ECS instance is in the Stopped status, you can release it. The release process is simple and involves the following parameters:

- InstanceId: Instance ID
- force: If this parameter is set to “True”, the ECS instance is released forcibly even when it is not in the Stopped state. Use caution when setting this parameter. Release by mistake may impact your services.

python def release_instance(instance_id, force=False): ''' delete instance according instance id, only support after pay instance. :param instance_id: instance id of the ecs instance, like 'i-***'. :param force: if force is false, you need to make the ecs instance stopped, you can execute the delete action. If force is true, you can delete the instance even the instance is running. :return: ''' request = DeleteInstanceRequest(); request.set_InstanceId(instance_id) request.set_Force(force) _send_request(request)
The following response is returned when an ECS instance is released successfully:

```
{ “RequestId” :” 689E5813-D150-4664-AF6F-2A27BB4986A3” }
```

Set the automatic release time for ECS instances

You can set the automatic release time for ECS instances to simplify instance management. When the set time is reached, Alibaba Cloud will release your ECS instance automatically.

Note: The automatic release time follows the ISO8601 standard in UTC time. The format is yyyy-MM-ddTHH:mm:ssZ. If the seconds place is not 00, it is automatically set to start from the current minute. Time range: 30 minutes to three years from the current time.

```
def set_instance_auto_release_time(instance_id, time_to_release = None):
'''
setting instance auto delete time
:param instance_id: instance id of the ecs instance, like 'i-***'.
:param time_to_release: if the property is setting, such as '2017-01-30T00:00:00Z'
it means setting the instance to be release at that time.
if the property is None, it means cancel the auto delete time.
:return:
'''
request = ModifyInstanceAutoReleaseTimeRequest()
request.set_InstanceId(instance_id)
if time_to_release is not None:
request.set_AutoReleaseTime(time_to_release)
_send_request(request)
```

Execute set_instance_auto_release_time(‘i-1111’, ‘2017-01-30T00:00:00Z’) to complete the time setting.

When the setting is successful, you can use DescribeInstances to query the automatic release time.

```
def describe_instance_detail(instance_id):
'''
describe instance detail
:param instance_id: instance id of the ecs instance, like 'i-***'.
:return:
'''
request = DescribeInstancesRequest()
request.set_InstanceIds(json.dumps([instance_id]))
response = _send_request(request)
if response is not None:
instance_list = response.get('Instances').get('Instance')
if len(instance_list) > 0:
return instance_list[0]


def check_auto_release_time_ready(instance_id):
detail = describe_instance_detail(instance_id=instance_id)
if detail is not None:
release_time = detail.get('AutoReleaseTime')
return release_time
```

Cancel the automatic release

If you need to cancel the automatic release due to service changes, run the following command to set the automatic release time to null:

```
set_instance_auto_release_time('i-1111')
```

Complete code

Note: Use caution when releasing ECS instances.

```
#  coding=utf-8

# if the python sdk is not install using 'sudo pip install aliyun-python-sdk-ecs'
# if the python sdk is install using 'sudo pip install --upgrade aliyun-python-sdk-ecs'
# make sure the sdk version is 2.1.2, you can use command 'pip show aliyun-python-sdk-ecs' to check

import json
import logging

from aliyunsdkcore import client
from aliyunsdkecs.request.v20140526.DeleteInstanceRequest import DeleteInstanceRequest
from aliyunsdkecs.request.v20140526.DescribeInstancesRequest import DescribeInstancesRequest
from aliyunsdkecs.request.v20140526.ModifyInstanceAutoReleaseTimeRequest import \
ModifyInstanceAutoReleaseTimeRequest
from aliyunsdkecs.request.v20140526.StopInstanceRequest import StopInstanceRequest

# configuration the log output formatter, if you want to save the output to file,
```

```
# append ",filename='ecs_invoke.log'" after datefmt.
logging.basicConfig(level=logging.INFO,
format='%(asctime)s %(filename)s[line:%(lineno)d] %(levelname)s %(message)s',
datefmt='%a, %d %b %Y %H:%M:%S')

clt = client.AcsClient('Your Access Key Id', 'Your Access Key Secrect', 'cn-beijing')

def stop_instance(instance_id, force_stop=False):
'''
stop one ecs instance.
:param instance_id: instance id of the ecs instance, like 'i-***'.
:param force_stop: if force stop is true, it will force stop the server and not ensure the data
write to disk correctly.
:return:
'''
request = StopInstanceRequest()
request.set_InstanceId(instance_id)
request.set_ForceStop(force_stop)
logging.info("Stop %s command submit successfully.", instance_id)
_send_request(request)

def describe_instance_detail(instance_id):
'''
describe instance detail
:param instance_id: instance id of the ecs instance, like 'i-***'.
:return:
'''
request = DescribeInstancesRequest()
request.set_InstanceIds(json.dumps([instance_id]))
response = _send_request(request)
if response is not None:
instance_list = response.get('Instances').get('Instance')
if len(instance_list) > 0:
return instance_list[0]

def check_auto_release_time_ready(instance_id):
detail = describe_instance_detail(instance_id=instance_id)
if detail is not None:
release_time = detail.get('AutoReleaseTime')
return release_time

def release_instance(instance_id, force=False):
'''
delete instance according instance id, only support after pay instance.
:param instance_id: instance id of the ecs instance, like 'i-***'.
:param force:
if force is false, you need to make the ecs instance stopped, you can
execute the delete action.
If force is true, you can delete the instance even the instance is running.
:return:
'''
request = DeleteInstanceRequest();
request.set_InstanceId(instance_id)
request.set_Force(force)
_send_request(request)
```

```
def set_instance_auto_release_time(instance_id, time_to_release = None):
'''
setting instance auto delete time
:param instance_id: instance id of the ecs instance, like 'i-***'.
:param time_to_release: if the property is setting, such as '2017-01-30T00:00:00Z'
it means setting the instance to be release at that time.
if the property is None, it means cancel the auto delete time.
:return:
'''
request = ModifyInstanceAutoReleaseTimeRequest()
request.set_InstanceId(instance_id)
if time_to_release is not None:
request.set_AutoReleaseTime(time_to_release)
_send_request(request)
release_time = check_auto_release_time_ready(instance_id)
logging.info("Check instance %s auto release time setting is %s. ", instance_id, release_time)

def _send_request(request):
'''
send open api request
:param request:
:return:
'''
request.set_accept_format('json')
try:
response_str = clt.do_action(request)
logging.info(response_str)
response_detail = json.loads(response_str)
return response_detail
except Exception as e:
logging.error(e)

if __name__ == '__main__':
logging.info("Release ecs instance by Aliyun OpenApi!")
set_instance_auto_release_time('i-1111', '2017-01-28T06:00:00Z')
# set_instance_auto_release_time('i-1111')
# stop_instance('i-1111')
# release_instance('i-1111')
# release_instance('i-1111', True)
```

If you want to learn other API operations in ECS, refer to ECS API operation.

Use OpenAPI to renew instances

In addition to the ECS Console or sales page, Alibaba Cloud provides APIs to renew instances and query and manage renewals.

This article involves the following important functions:

- Query ECS instances by expiration time
- Renew instances

- Query the automatic renewal time of an ECS instance
- Set the automatic renewal time of an ECS instance

Lifecycle is important to ECS instances in the Subscription mode. If you fail to renew your ECS instance on time, the instance may be locked or even released, thus affecting your service continuity. You can use APIs to view the resource expiration time and renew your instance or recharge your account.

This article involves the following APIs:

- Instance list query API
- Instance renewal API

Query ECS instances that will expire within the specified time range

The instance list query API can be used to query the instances that will expire within the specified time range by setting the filter parameters ExpiredStartTime and ExpiredEndTime. The time parameters follow the ISO8601 standard in UTC time, using the format yyyy-MM-ddTHH:mmZ. The system returns the list of instances that will expire within the specified time range. If you need to filter by security group, just add the security group ID.

```
INSTANCE_EXPIRED_START_TIME_IN_UTC_STRING = '2017-01-22T00:00Z'
INSTANCE_EXPIRE_END_TIME_IN_UTC_STRING = '2017-01-28T00:00Z'

def describe_need_renew_instance(page_size=100, page_number=1, instance_id=None,
check_need_renew=True, security_group_id=None):
request = DescribeInstancesRequest()
if check_need_renew is True:
request.set_Filter3Key("ExpiredStartTime")
request.set_Filter3Value(INSTANCE_EXPIRED_START_TIME_IN_UTC_STRING)
request.set_Filter4Key("ExpiredEndTime")
request.set_Filter4Value(INSTANCE_EXPIRE_END_TIME_IN_UTC_STRING)
if instance_id is not None:
request.set_InstanceIds(json.dumps([instance_id]))
if security_group_id:
request.set_SecurityGroupId(security_group_id)
request.set_PageNumber(page_number)
request.set_PageSize(page_size)
return _send_request(request)
```

Renew ECS instances

Only ECS instances in the Subscription mode can be renewed. Pay-As-You-Go instances cannot be renewed. Renewals must be paid by account balance or credit. Fee deduction and order creation are in sync with API execution. Ensure that there is sufficient balance in your account.

python def _renew_instance_action(instance_id, period='1'): request = RenewInstanceRequest() request.set_Period(period) request.set_InstanceId(instance_id) response = _send_request(request) logging.info('renew %s ready, output is %s ', instance_id, response)
Fees are automatically deducted when the instance is renewed. After the renewal is completed, you can use InstanceId to query the latest resource expiration time of the instance. Because the API is executed asynchronously, the expiration time is updated in 10 seconds.

Enable automatic ECS instance renewal

Alibaba Cloud introduces the automatic renewal function for ECS instances in the Subscription mode to help you reduce the cost of expired resource maintenance. Fee deduction for automatic renewal starts at 08:00:00 seven days before the expiration date. If fee deduction fails on the first day, the deduction process repeats on the following days in sequence until fees are deducted successfully or resources are locked after the seven-day period. Ensure that you have sufficient balance or credit amount in your account.

Query the automatic renewal setting

You can use OpenAPI to query and set automatic renewal. The API supports only ECS instances in the Subscription mode. If you use the API on a Pay-As-You-Go instance, an error will be returned. You can query the automatic renewal status of up to 100 ECS instances in the Subscription mode at a time. Use commas to separate multiple instance IDs.

The input parameter of DescribeInstanceAutoRenewAttribut is the instance ID.

- InstanceId: You can query up to 100 ECS instances in the Subscription mode at a time. Use commas to separate multiple instance IDs.

python # check the instances is renew or not def describe_auto_renew(instance_ids, expected_auto_renew=True): describe_request = DescribeInstanceAutoRenewAttributeRequest() describe_request.set_InstanceId(instance_ids) response_detail = _send_request(request=describe_request) failed_instance_ids = '' if response_detail is not None: attributes = response_detail.get('InstanceRenewAttributes').get('InstanceRenewAttribute') if attributes: for item in attributes: auto_renew_status = item.get('AutoRenewEnabled') if auto_renew_status != expected_auto_renew: failed_instance_ids += item.get('InstanceId') + ',' describe_auto_renew('i-1111,i-2222')
The following content is returned:

python {"InstanceRenewAttributes":{"InstanceRenewAttribute":[{"Duration":0,"InstanceId":"i-1111","AutoRenewEnabled":false},{"Duration":0,"InstanceId":"i-2222","AutoRenewEnabled":false}]},"RequestId":"71FBB7A5-C793-4A0D-B17E-D6B426EA746A"}
If automatic renewal is set, the returned attribute AutoRenewEnabled is “True”. If automatic renewal is not set, the attribute is “False”.

Set/Cancel automatic renewal for ECS instances

Automatic renewal setting requires three input parameters:

- InstanceId: You can set automatic renewal for up to 100 ECS instances in the Subscription mode at a time. Use commas to separate multiple instance IDs.
- Duration (month): 1, 2, 3, 6, or 12.
- AutoRenew: “True” or “False” (“True” is enabling automatic renewal, and “False” is cancelling automatic renewal.

python def setting_instance_auto_renew(instance_ids, auto_renew = True): logging.info('execute enable auto renew ' + instance_ids) request = ModifyInstanceAutoRenewAttributeRequest(); request.set_Duration(1); request.set_AutoRenew(auto_renew); request.set_InstanceId(instance_ids) _send_request(request)
When the operation is successful, the following response is returned:

python {"RequestId":"7DAC9984-AAB4-43EF-8FC7-7D74C57BE46D"}
You can perform a query after successful renewal. The system will return the renewal duration and the status of automatic renewal (enabled/disabled).

python {"InstanceRenewAttributes":{"InstanceRenewAttribute":[{"Duration":1,"InstanceId":"i-1111","AutoRenewEnabled":true},{"Duration":1,"InstanceId":"i-2222","AutoRenewEnabled":true}]},"RequestId":"7F4D14B0-D0D2-48C7-B310-B1DF713D4331"}

Complete code

```
#  coding=utf-8

# if the python sdk is not install using 'sudo pip install aliyun-python-sdk-ecs'
# if the python sdk is install using 'sudo pip install --upgrade aliyun-python-sdk-ecs'
# make sure the sdk version is 2.1.2, you can use command 'pip show aliyun-python-sdk-ecs' to check

import json
import logging

from aliyunsdkcore import client
from aliyunsdkecs.request.v20140526.DescribeInstanceAutoRenewAttributeRequest import \
DescribeInstanceAutoRenewAttributeRequest
from aliyunsdkecs.request.v20140526.DescribeInstancesRequest import DescribeInstancesRequest
from aliyunsdkecs.request.v20140526.ModifyInstanceAutoRenewAttributeRequest import \
ModifyInstanceAutoRenewAttributeRequest
from aliyunsdkecs.request.v20140526.RenewInstanceRequest import RenewInstanceRequest

logging.basicConfig(level=logging.INFO,
format='%(asctime)s %(filename)s[line:%(lineno)d] %(levelname)s %(message)s',
datefmt='%a, %d %b %Y %H:%M:%S')

clt = client.AcsClient('Your Access Key Id', 'Your Access Key Secrect', 'cn-beijing')

# data format in UTC, only support passed the value for minute, seconds is not support.
INSTANCE_EXPIRED_START_TIME_IN_UTC_STRING = '2017-01-22T00:00Z'
INSTANCE_EXPIRE_END_TIME_IN_UTC_STRING = '2017-01-28T00:00Z'
```

```
def renew_job(page_size=100, page_number=1, check_need_renew=True, security_group_id=None):
response = describe_need_renew_instance(page_size=page_size, page_number=page_number,
check_need_renew=check_need_renew,
security_group_id=security_group_id)
response_list = response.get('Instances').get('Instance')
logging.info("%s instances need to renew", str(response.get('TotalCount')))
if response_list > 0:
instance_ids = ''
for item in response_list:
instance_id = item.get('InstanceId')
instance_ids += instance_id + ','
renew_instance(instance_id=instance_id)
logging.info("%s execute renew action ready", instance_ids)

def describe_need_renew_instance(page_size=100, page_number=1, instance_id=None,
check_need_renew=True, security_group_id=None):
request = DescribeInstancesRequest()
if check_need_renew is True:
request.set_Filter3Key("ExpiredStartTime")
request.set_Filter3Value(INSTANCE_EXPIRED_START_TIME_IN_UTC_STRING)
request.set_Filter4Key("ExpiredEndTime")
request.set_Filter4Value(INSTANCE_EXPIRE_END_TIME_IN_UTC_STRING)
if instance_id is not None:
request.set_InstanceIds(json.dumps([instance_id]))
if security_group_id:
request.set_SecurityGroupId(security_group_id)
request.set_PageNumber(page_number)
request.set_PageSize(page_size)
return _send_request(request)

# check the instances is renew or not
def describe_instance_auto_renew_setting(instance_ids, expected_auto_renew=True):
describe_request = DescribeInstanceAutoRenewAttributeRequest()
describe_request.set_InstanceId(instance_ids)
response_detail = _send_request(request=describe_request)
failed_instance_ids = ''
if response_detail is not None:
attributes = response_detail.get('InstanceRenewAttributes').get('InstanceRenewAttribute')
if attributes:
for item in attributes:
auto_renew_status = item.get('AutoRenewEnabled')
if auto_renew_status != expected_auto_renew:
failed_instance_ids += item.get('InstanceId') + ','
if len(failed_instance_ids) > 0:
logging.error("instance %s auto renew not match expect %s.", failed_instance_ids,
expected_auto_renew)

def setting_instance_auto_renew(instance_ids, auto_renew=True):
logging.info('execute enable auto renew ' + instance_ids)
request = ModifyInstanceAutoRenewAttributeRequest();
request.set_Duration(1);
request.set_AutoRenew(auto_renew);
request.set_InstanceId(instance_ids)
_send_request(request)
describe_instance_auto_renew_setting(instance_ids, auto_renew)
```

```
# if using the instance id can be found means the instance is not renew successfully.
def check_instance_need_renew(instance_id):
response = describe_need_renew_instance(instance_id=instance_id)
if response is not None:
return response.get('TotalCount') == 1
return False

# Renew an instance for a month
def renew_instance(instance_id, period='1'):
need_renew = check_instance_need_renew(instance_id)
if need_renew:
_renew_instance_action(instance_id=instance_id, period=period)
# describe_need_renew_instance(instance_id=instance_id, check_need_renew=False)

def _renew_instance_action(instance_id, period='1'):
request = RenewInstanceRequest()
request.set_Period(period)
request.set_InstanceId(instance_id)
response = _send_request(request)
logging.info('renew %s ready, output is %s ', instance_id, response)

def _send_request(request):
request.set_accept_format('json')
try:
response_str = clt.do_action(request)
logging.info(response_str)
response_detail = json.loads(response_str)
return response_detail
except Exception as e:
logging.error(e)

if __name__ == '__main__':
logging.info("Renew ECS Instance by OpenApi!")
# Query whether there is any instance that needs to be renewed within the specified time range.
describe_need_renew_instance()
# Renew an instance by direct fee deduction
renew_instance('i-1111')
# Query the status of automatic renewal
# describe_instance_auto_renew_setting('i-1111,i-2222')
# Set automatic instance renewal
# setting_instance_auto_renew('i-1111,i-2222')
```

If you want to learn other API operations in ECS, refer to ECS API operation.

Instance custom data

Instance custom scripts are a type of script provided by Alibaba Cloud for users to customize the startup behaviors of ECS instances. For details, refer to Instance custom data.

This document takes a Linux instance for example to introduce how to use instance custom scripts to configure your own yum repository, NTP service, and DNS service when creating a Linux instance. Instance custom scripts also enables you to configure NTP service and DNS service for a Windows instance.

Scenario

Currently, when a Linux instance is started, Alibaba Cloud automatically configures pre-defined yum repository, NTP service, and DNS service for the instance. However, if you want to have your own yum repository, NTP service, and DNS service, use instance custom scripts to implement this requirement.

Note:

- If you are using a custom yum repository, Alibaba Cloud does not provide support for it.
- If you are using a custom NTP service, Alibaba Cloud does not provide time service.

Customize yum repository, NTP service, and DNS service

Follow the steps below to customize yum repository, NTP service, and DNS service for a Linux instance when creating it.

Log on to the ECS console and create an instance. Configure the instance as follows:

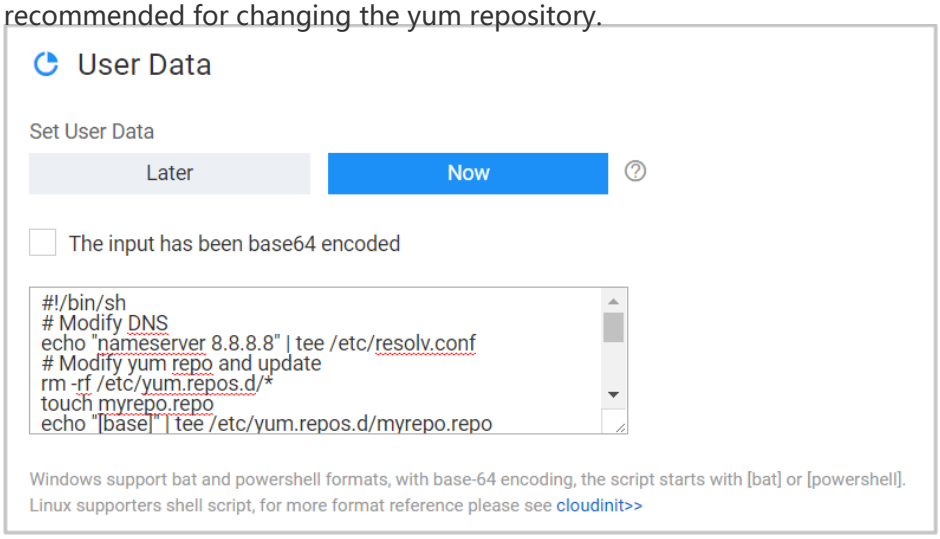
- **Network Type**: Select **VPC**.
- **Instance Type**: Select an I/O-optimized instance.
- **Operating System**: Select CentOS 7.2 in **Public Image** tab.
- **Security Setup**: Select one to meet your requirement.

Enter the following script in the **User Data** box on the instance creation page.

```
#!/bin/sh
# Modify DNS
echo "nameserver 8.8.8.8" | tee /etc/resolv.conf
# Modify yum repo and update
rm -rf /etc/yum.repos.d/*
touch myrepo.repo
echo "[base]" | tee /etc/yum.repos.d/myrepo.repo
echo "name=myrepo" | tee -a /etc/yum.repos.d/myrepo.repo
echo "baseurl=http://mirror.centos.org/centos" | tee -a /etc/yum.repos.d/myrepo.repo
echo "gpgcheck=0" | tee -a /etc/yum.repos.d/myrepo.repo
echo "enabled=1" | tee -a /etc/yum.repos.d/myrepo.repo
yum update -y
# Modify NTP Server
echo "server ntp1.aliyun.com" | tee /etc/ntp.conf
systemctl restart ntpd.service
```

Note:

- The first line must be #!/bin/sh, with no leading space.
- Do not add unnecessary spaces or carriage return characters in the full text.
- You can customize URLs of your own DNS server, NTP Server, and yum repository based on the instance situations.
- The preceding content applies to CentOS 7.2 images. If you are using other images, modify the scripts as needed.
- You can also define the yum repository in the scripts of the Cloud Config type, but it is not recommended because it is not flexible enough to get adapted to Alibaba Cloud that may pre-configure some yum repository. Scripts of script type is recommended for changing the yum repository.



After the configuration is completed, click **Buy Now** and activate the instance following instructions on the page.

After the instance is created, you can log on to the instance to view the implementation details, as shown in the following figure.

```
[root@iZwz99v9qbmmk2dswgnzg8Z yum.repos.d]# cat /etc/resolv.conf
nameserver 8.8.8.8
[root@iZwz99v9qbmmk2dswgnzg8Z yum.repos.d]# ping www.baidu.com
PING www.a.shifen.com (103.235.46.39) 56(84) bytes of data.
64 bytes from 103.235.46.39: icmp_seq=1 ttl=48 time=73.3 ms
^C64 bytes from 103.235.46.39: icmp_seq=2 ttl=48 time=74.8 ms

--- www.a.shifen.com ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 73.393/74.113/74.833/0.720 ms
[root@iZwz99v9qbmmk2dswgnzg8Z yum.repos.d]# cat /etc/ntp.conf
server ntp1.aliyun.com
[root@iZwz99v9qbmmk2dswgnzg8Z yum.repos.d]# systemctl status ntpd.service
● ntpd.service - Network Time Service
   Loaded: loaded (/usr/lib/systemd/system/ntpd.service; enabled; vendor preset: disabled)
   Active: active (running) since Mon 2017-03-13 11:08:11 CST; 1min 58s ago
  Process: 6235 ExecStart=/usr/sbin/ntpd -u ntp:ntp $OPTIONS (code=exited, status=0/SUCCESS)
 Main PID: 6237 (ntpd)
   CGroup: /system.slice/ntpd.service
           └─6237 /usr/sbin/ntpd -u ntp:ntp -g

Mar 13 11:08:11 iZwz99v9qbmmk2dswgnzg8Z ntpd[6237]: 0.0.0.0 c01d 0d kern kernel time sync enabled
Mar 13 11:08:11 iZwz99v9qbmmk2dswgnzg8Z ntpd[6237]: ntp_io: estimated max descriptors: 1024, initial socket boundary: 16
Mar 13 11:08:11 iZwz99v9qbmmk2dswgnzg8Z ntpd[6237]: Listen and drop on 0 v4wildcard 0.0.0.0 UDP 123
Mar 13 11:08:11 iZwz99v9qbmmk2dswgnzg8Z ntpd[6237]: Listen and drop on 1 v6wildcard :: UDP 123
Mar 13 11:08:11 iZwz99v9qbmmk2dswgnzg8Z ntpd[6237]: Listen normally on 2 lo 127.0.0.1 UDP 123
Mar 13 11:08:11 iZwz99v9qbmmk2dswgnzg8Z ntpd[6237]: Listen normally on 3 eth0 172.18.48.114 UDP 123
Mar 13 11:08:11 iZwz99v9qbmmk2dswgnzg8Z ntpd[6237]: Listening on routing socket on fd #20 for interface updates
Mar 13 11:08:11 iZwz99v9qbmmk2dswgnzg8Z ntpd[6237]: 0.0.0.0 c016 06 restart
Mar 13 11:08:11 iZwz99v9qbmmk2dswgnzg8Z ntpd[6237]: 0.0.0.0 c012 02 freq_set kernel 0.000 PPM
Mar 13 11:08:11 iZwz99v9qbmmk2dswgnzg8Z ntpd[6237]: 0.0.0.0 c011 01 freq_not_set
[root@iZwz99v9qbmmk2dswgnzg8Z yum.repos.d]# cat /etc/yum.repos.d/myrepo.repo
[base]
name=myrepo
baseurl=http://mirror.centos.org/centos
gpgcheck=0
enabled=1
[root@iZwz99v9qbmmk2dswgnzg8Z yum.repos.d]#
```

The preceding figure shows that you have successfully customized the DNS service, the NTP service, and the yum repository.

Instance custom scripts are a type of script provided by Alibaba Cloud for users to customize the startup behaviors of ECS instances. For details, refer to Instance custom data.

This document takes a Linux instance as an example to introduce how to use instance custom scripts to create a new account with the root user privilege for a Linux instance when creating the instance. Instance custom scripts also enable you to create a new account with the administrator privilege for a Windows instance.

Scenario

Use instance custom scripts of instances if you want to achieve the following results when creating a Linux ECS instance:

- Disable the default **root** account that comes with a Linux ECS instance. You can use the script to customize how to disable the root user and how many privileges of the root user to be disabled.
- Create a new account with the root user privilege and customize the account name.
- Use only SSH key pairs, but not user password, for remote logon to manage the instance using the newly-created account with the root user privilege.
- If this newly-created account requires performing some operations that only can be done by a user with root user privilege, the sudo command can be used without a password for privilege escalation.

Create a new account with the root user privilege

Follow the steps below to create a new account with the root user privilege.

Log on to the ECS console and create a Linux instance. Configure the instance as follows:

- **Network Type**: Select **VPC**.
- **Instance Type**: Select an I/O-optimized instance.
- **Operating System**: Select CentOS 7.2 in **Public Image** tab.
- **Security Setup**: select **Later**.

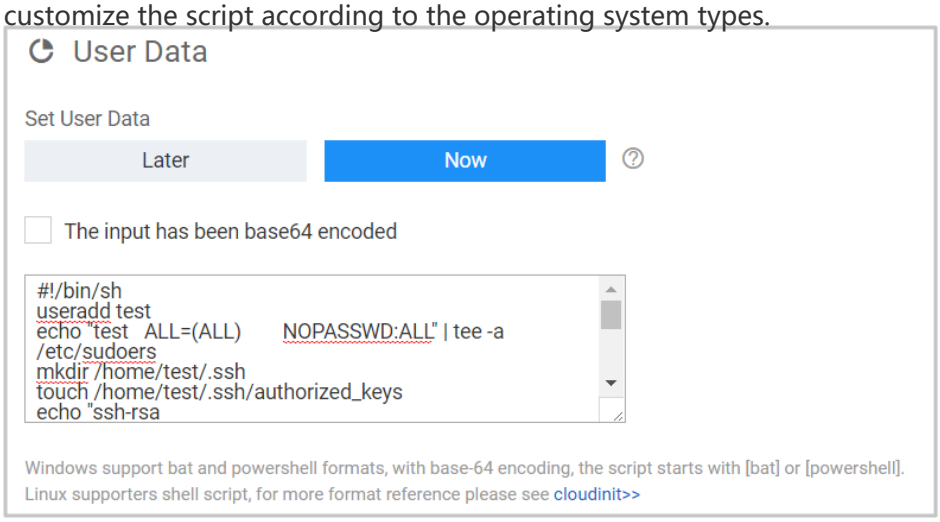
Enter the following script in the **User Data** box on the instance creation page:

```
#!/bin/sh
useradd test
echo "test ALL=(ALL) NOPASSWD:ALL" | tee -a /etc/sudoers
mkdir /home/test/.ssh
touch /home/test/.ssh/authorized_keys
```

```
echo "ssh-rsa
AAAAB3NzaC1yc2EAAAABJQAAAQEAhGqhEh/rGbIMCGItFVtYpsXPQrCaunGJKZVIWtINrGZwusLc290qDZ
93KCeb8o6X1Iby1Wm+psZY8THE+/BsXq0M0HzfkQZD2vXuhRb4xi1z98JHskX+0jnbjqYGY+Brgai9BvKDX
TTSyJtCYUnEKxvcK+d1ZwxbNuk2QZ0ryHESDbSaczlNFgFQEDxhCrvko+zWLjTVnomVUDhdMP2g6fZ0tgF
VwkJFV0bE7oob3NOVcrx2TyhfcAjA4M2/Ry7U2MFADDC+EVkpoVDm0SOT/hYJgaVM1xMDlSeE7kzX7yZ
bJLR1XAWV1xzZkNclY5w1kPnW8qMYuSwhpXzt4gsF0w== rsa-key-20170217" | tee -a
/home/test/.ssh/authorized_keys
```

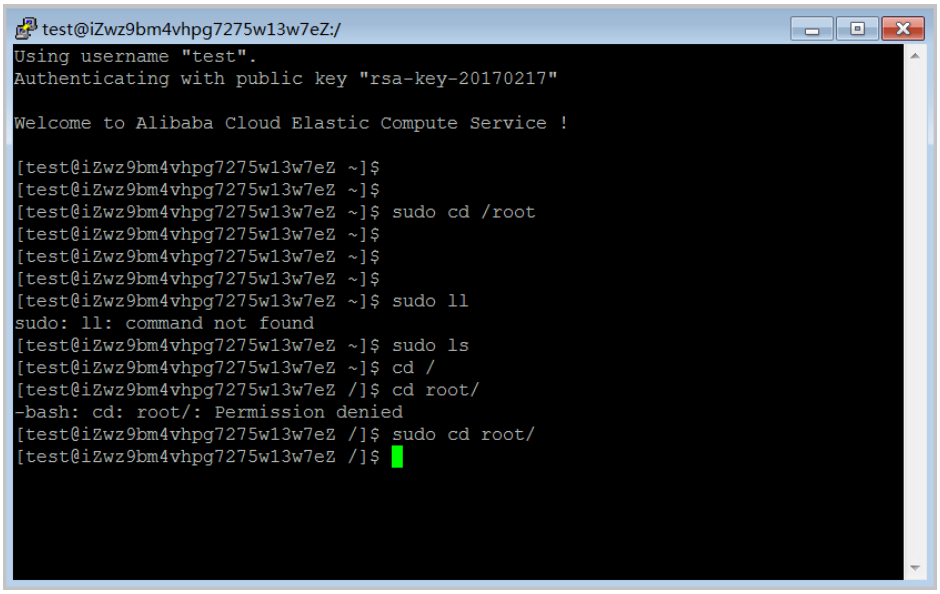
Note:

- The first line must be #!/bin/sh with no leading space.
- Do not enter unnecessary spaces or carriage return characters in the text.
- The last line is your public key. You can define it.
- You can add other configuration in the script, as you need.
- The example script only applies to CentOS 7.2. If you are using other images, customize the script according to the operating system types.



After the configuration, click **Buy Now** and activate the instance following instructions on the page.

After the instance is created, you can use the newly-created **test** user to connect to the instance using an SSH private key. You can also escalate the permission using the sudo command and execute various operations that require the root user privilege, as shown in the figure.



Overview

Previously, applications deployed on an ECS Instance usually needed to use Access Key ID and Access Key Secret (AK) to access APIs of other Alibaba Cloud products. AK is the key to accessing Alibaba Cloud APIs and has all of the permissions of the corresponding accounts. In order to help applications manage the AK, you have to save AK in the configuration files of the application or save it in an ECS instance by using other methods, which makes it more complicated to manage the AK and reduces its confidentiality. What' s more, if you need concurrent deployment across regions, the AK will be diffused along with the images or instances created by the image, which makes you have to update and re-deploy the instances and images one by one when changing the AK.

Now with the help of the instance RAM role, you can assign a RAM role to an ECS instance. The applications on the instance can then access APIs of other cloud products with the STS credential. The STS credential is automatically generated and updated by the system, and the applications can use the specified meta data URL to obtain the STS credential without special management. Meanwhile, you can modify the RAM role and the authorization policy to grant different or identical access permissions to an instance to different Alibaba Cloud products.

This article introduces how to create an ECS instance that plays a RAM role and how to enable the applications on the ECS instance to access other Alibaba Cloud products with the STS credential. In this article, the Python SDK on an ECS instance accessing an OSS bucket is used as the example. The detailed steps are as follows:

1. Create a RAM role and attach it to an authorization policy.
2. Create an ECS instance playing the RAM role to create.
3. Within the instance, access the metadata URL to obtain the STS credential.
4. Use the Python SDK to access OSS using the STS credential.

Operating procedure

1. Create a RAM role and attach it to an authorization policy

Use the CreateRole API to create a RAM role. The required request parameters are:

- **RoleName**: Specify a name for the role. *EcsRamRoleTest* is used in this example.
- **AssumeRolePolicyDocument**: Specify a policy as follows, which indicates that the role to be created is a service role and an Alibaba Cloud product (ECS in this example) is assigned to play this role.

```
{
"Statement": [
{
"Action": "sts:AssumeRole",
"Effect": "Allow",
"Principal": {
"Service": [
"ecs.aliyuncs.com"
]
}
}
],
"Version": "1"
}
```

Use the CreatePolicy API to create an authorization policy. The required request parameters are:

- **PolicyName**: Specify a name for the authorization policy. *EcsRamRolePolicyTest* is used in this example.
- **PolicyDocument**: Specify a policy as follows, which indicates that the role has OSS read-only permission.

```
{
"Statement": [
{
"Action": [
"oss:Get*",
"oss:List*"
],
"Effect": "Allow",
"Resource": "*"
}
],
"Version": "1"
}
```

Use the AttachPolicyToRole API to attach the authorization policy to the role. The required request parameters are:

- **PolicyType**: Set it to *Custom*.
- **PolicyName**: Use the policy name specified in step 2. Use *EcsRamRolePolicyTest* in this example.
- **RoleName**: Use the role name specified in step 1. Use *EcsRamRoleTest* in this example.

2. Create an ECS instance playing the RAM role

Prerequisites

A VPC network is available.

Operating procedure

Follow the steps to create an ECS instance playing the RAM role.

Use the CreateInstance API to create an ECS instance. The required request parameters are:

- **RegionId**: The region of the instance. In this example, *cn-hangzhou* is used.
- **ImageId**: The image of the instance. In this example, *centos_7_03_64_40G_alibase_20170503.vhd* is used.
- **InstanceType**: The type of the instance. In this example, *ecs.xn4.small* is used.
- **VSwitchId**: The virtual switch of the VPC network where the instance is located.

  > Because the instance RAM role only supports VPC network, VSwitchId is required.

- **RamRoleName**: The name of RAM Role. In this example, *EcsRamRoleTest* is used.

  > If you want to authorize a sub account to create an ECS instance playing the specified RAM role, besides the permission to create an ECS instance, the sub account must have the PassRole permission. Therefore, you must customize an authorization policy as follows and attach it to the sub account. If the action is creating an ECS instance only, set *[ECS RAM Action]* to ecs:CreateInstance. You can grant more permissions to meet your needs. For details, see Actions in RAM that can be authorized to an ECS instance. If you want to grant all ECS action permissions to the sub account, set *[ECS RAM Action]* to ecs:*.

```
{
"Statement": [
{
"Action": "[ECS RAM Action]",
```

```
"Resource": "*",
"Effect": "Allow"
},
{
"Action": "ram:PassRole",
"Resource": "*",
"Effect": "Allow"
],
"Version": "1"
}
```

Set the password and start the instance.

Set the ECS instance to access the Internet by using API or on the ECS console.

> To set an ECS instance in a VPC network to access the Internet on a console, see **Bind an Elastic IP address (EIP)** in the *Quick Start* of Virtual Private Cloud.

3. Access the metadata URL within the instance to obtain the STS credential

Follow the steps to obtain the STS credential of the instance.

Connect to the instance.

Access the following URL to obtain the STS credential.
http://100.100.100.200/latest/meta-data/ram/security-credentials/EcsRamRoleTest
The last part of the URL is the RAM role name, which must be replaced with the one you create.

> In this example, we run the curl command to access the URL. If you are using a Windows ECS instance, see **Use metadata of an instance** in ECS the *User Guide* to obtain the STS credential.

The return parameters are as follows.

```
[root@local ~]# curl http://100.100.100.200/latest/meta-data/ram/security-credentials/EcsRamRoleTest
{
"AccessKeyId" : "STS.J8XXXXXXXXXX4",
"AccessKeySecret" : "9PjfXXXXXXXXXBf2XAW",
"Expiration" : "2017-06-09T09:17:19Z",
"SecurityToken" : "CAIXXXXXXXXXXXwmBkleCTkyI+",
"LastUpdated" : "2017-06-09T03:17:18Z",
```

```
"Code" : "Success"
}
```

4. Use the Python SDK to access OSS with the STS credential

In this example, with the STS credential, we use the Python SDK to list 10 files in an OSS bucket that is in the same region with the instance.

Prerequisites

- You have remotely connected to the ECS instance.
- Python has been installed on the ECS instance. If you are using a Linux ECS instance, pip must be installed.
- A bucket has been created in the region of the instance, and the bucket name and the Endpoint have been acquired. In this example, the bucket name is *ramroletest*, and the endpoint is *oss-cn-hangzhou.aliyuncs.com*.

Operating procedure

Follow the steps to use the Python SDK to access OSS.

Run the command pip install oss2 to install OSS Python SDK.

If you are using a Windows ECS instance, see Installation in the *Python-SDK* Reference of Object Storage Service.

Run the following commands to test, of which:

- The three parameters in oss2.StsAuth must be set to the values of the return parameters: AccessKeyId, AccessKeySecret, and SecurityToken.
- The last two parameters in oss2.Bucket are the bucket name and the endpoint.

```
import oss2
from itertools import islice
auth = oss2.StsAuth(<AccessKeyId>, <AccessKeySecret>, <SecurityToken>)
bucket = oss2.Bucket(auth, <your Endpoint>, <your Bucket name>)
for b in islice(oss2.ObjectIterator(bucket), 10):
print(b.key)
```

The output result is displayed as follows.

```
[root@local ~]# python
Python 2.7.5 (default, Nov 6 2016, 00:28:07)
```

```
[GCC 4.8.5 20150623 (Red Hat 4.8.5-11)] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> import oss2
>>> from itertools import islice
>>> auth = oss2.StsAuth("STS.J8XXXXXXXXXX4", "9PjfXXXXXXXXXBf2XAW",
"CAIXXXXXXXXXXXwmBkleCTkyI+")
>>> bucket = oss2.Bucket(auth, "oss-cn-hangzhou.aliyuncs.com", "ramroletest")
>>> for b in islice(oss2.ObjectIterator(bucket), 10):
... print(b.key)
...
ramroletest.txt
test.sh
```

Migration Best Practices

Use migration script to migrate a Linux instance

You can migrate data from an instance running on Linux on Premise or other cloud service providers to an ECS Linux instance.

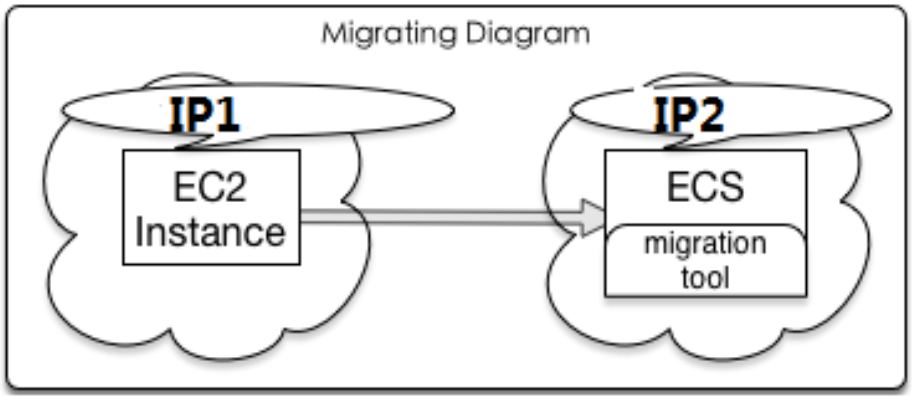
Prerequisites

1. Ensure that you have created the instances running the same version of OS on Alibaba Cloud and other cloud service provider.
2. Ensure that the instances can access to the Internet.
3. The below Linux OSs are supported:
    - Red Hat Enterprise Linux (RHEL) 5, 6, 7
    - CentOS 5, 6, 7
    - Ubuntu 10, 12, 13, 14
    - Debian 6, 7
    - OpenSUSE 13.1
    - SUSE Linux 10, 11, 12
    - CoreOS 681.2.0+-

Application scenario

In this scenario, we have created two instances: one is an EC2 instance (IP1) as the source instance,

and the other is an ECS instance (IP2) as the target instance. Here, we will migrate the data from the EC2 instance to the ECS instance.



Introduction to Migration Script

Migration script is used to enable synchronous data migration between two instances running the same version of OS.

Prerequisites:

- Ensure that a SSH channel is established between the source instance and the destination instance.
- Ensure that the Root user right is activated on the source instance and the destination instance. Otherwise, the Root user cannot read and get system files.
- Run rsync for remote file synchronization.

Operation procedure on remote file synchronization:

1. Synchronize the files in the root partition of the destination host to the temporary directory of the local host, except for Runtime files like /sys, /proc, and /dev.
2. Synchronize the files in temporary directory of the local host to the root partition of the local host, except for platform-related settings like network, grub, and fstab.
3. Reboot the local host. As a result, the local host will run the same OS as the destination host with parameters configured (for instance, network).

Download script: [download]

Operation procedure

Step 1: Authorize root to log on to the EC2 instance

Configure the /etc/ssh/sshd_config file, and find and uncomment these two lines to allow root to log on by password.

vim /etc/ssh/sshd_config

Find and uncomment these two lines

PermitRootLogin yes

PasswordAuthentication yes

Set the root password.

passwd root

Ensure that you have stopped the running application on your EC2 instance before migration.

Step 2: Log on to the ECS instance via SSH and install the migration tool

Run the following command to install rsync.

apt-get install rsync

Download the migration tool to /tmp and execute the tool. For example, download the migrate tool to /tmp/migrate_tool.

chmod +x migrate

root@iZu1e533scsZ:/tmp/migrate_tool# ./migrate migrate IP1

[Thu Jan 14 12:13:22 UTC 2016] [INFO] “begin to prepare”

The authenticity of host ‘XX.XX.XX.XX’ can’t be established.

ECDSA key fingerprint is 7c:3b:7d:43:cf:5a:2c:2e:2d:e2:e5:05:31:bd:4d:c7.

Are you sure you want to continue connecting (yes/no)? yes

Warning: Permanently added ‘XX.XX.XX.XX’ (ECDSA) to the list of known hosts.

root@54.200.102.210’s password:

Step 3: Enter the EC2 root password

After you have entered the EC2 root password, the migration tool starts transferring all files of the system disk on the EC2 instance, except for the run-time files.

...

...

var/log/mysql/

var/log/mysql/error.log

var/log/upstart/

var/log/upstart/console-setup.log

var/log/upstart/container-detect.log

var/log/upstart/cryptdisks.log

var/log/upstart/network-interface-eth0.log

var/log/upstart/networking.log

var/log/upstart/pollinate.

var/log/upstart/procps-static-network-up.log

var/log/upstart/procps-virtual-filesystems.log

var/log/upstart/rsyslog.log

var/log/upstart/systemd-logind.log

After migration is completed, the system prints the progress information in stdout and run postcheck.

sent 277,016,651 bytes received 161,051 bytes 17,882,432.39 bytes/sectotal size is 1,194,098,631 speedup is 4.31

[Thu Jan 14 12:17:00 UTC 2016] [INFO] “end of migrate”

[Thu Jan 14 12:17:00 UTC 2016] [INFO] “begin to postcheck”

[Thu Jan 14 12:17:04 UTC 2016] [INFO] “end of postcheck”

Sometimes, postcheck may end with a prompt “failed to re-install grub, you must do it manually.” In this case, execute the below command to complete the migration:

grub-install /dev/xvda >/dev/null 2>&1

As for the ECS instance running CentOS (7uX), run the below command instead:

Grub2-install /dev/xvda >/dev/null 2>&1

Log files are put in the /tmp named aliyun_migrate.log.

Step 4: Verify

Resume your applications and verify the results on both the EC2 instance and the ECS instance.